

AMENDMENTS TO THE CLAIMS

1. (Original) A transport format combination indicator (TFCI) encoding apparatus in a CDMA mobile communication system, comprising:
 - a one-bit generator for generating a sequence having the same symbols;
 - a basis orthogonal sequence generator for generating a plurality of basis orthogonal sequences;
 - a basis mask sequence generator for generating a plurality of basis mask sequences; and
 - an operation unit for receiving TFCI bits that are divided into a first information part representing biorthogonal sequence conversion, a second information part representing orthogonal sequence conversion, and a third information part representing mask sequence conversion and adding an orthogonal sequence selected from the basis orthogonal sequence based on the second information part and a mask sequence selected based on the third information part.
2. (Original) The TFCI encoding apparatus of claim 1, wherein the same symbols are 1s.
3. (Original) The TFCI encoding apparatus of claim 1, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.
4. (Original) The TFCI encoding apparatus of claim 1, wherein the basis mask sequences includes a first mask sequence “00101000011000111111000001110111”, a second mask sequence “00000001110011010110110111000111”, a fourth mask sequence “00001010111110010001101100101011”, and an eighth mask sequence “00011100001101110010111101010001”.
5. (Original) The TFCI encoding apparatus of claim 1, wherein the operation unit further comprises a converter for providing bi-orthogonal sequences by complementing the orthogonal sequences.
6. (Original) The TFCI encoding apparatus of claim 5, wherein the converter is an adder for adding a ‘1’ to the symbols in each of the orthogonal sequences.

7. (Original) The TFCI encoding apparatus of claim 1, wherein the basis mask sequence length is 32 symbols .

8. (Original) The TFCI encoding apparatus of claim 1, wherein the basis mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates a column transposition function to convert the sequences in the first group into the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group into the mask sequences .

9. (Original) The TFCI encoding apparatus of claim 8, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

10. (Original) The TFCI encoding apparatus of claim 1, wherein the operation unit comprises:
a first multiplier for multiplying the same symbols by the first information part;
a plurality of second multipliers for multiplying the basis orthogonal sequences by the respective TFCI bits representing the second information part;
a plurality of third multipliers for multiplying the basis mask sequences by the respective TFCI bits representing the third information part; and
an adder for adding the outputs of the first, second, and third multipliers .

Claims 11 to 18 (Cancelled)

19. (Original) A TFCI encoding apparatus in a CDMA mobile communication system, comprising:
a one-bit generator for generating a sequence having the same symbols;

- an orthogonal sequence generator for generating a plurality of basis orthogonal sequences;
- a mask sequence generator for generating a plurality of basis mask sequences;
- a plurality of multipliers as many as input TFCI bits, for multiplying the same symbols by corresponding TFCI bits, the plurality of basis orthogonal sequences by corresponding TFCI bits, and the plurality of basis mask sequences by corresponding TFCI bits; and
- an adder for summing sequences received from the plurality of multipliers.

Claims 20 and 21 (Cancelled)

22. (Original) The TFCI encoding apparatus of claim 19, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

23. (Original) The TFCI encoding apparatus of claim 19, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

24. (Original) A TFCI encoding method in a CDMA mobile communication system, comprising the steps of:

- generating the same symbols;
- generating a plurality of basis orthogonal sequences;
- generating a plurality of basis mask sequences; and
- receiving TFCI bits that are divided into a first information part representing biorthogonal sequence conversion, a second information part representing orthogonal sequence conversion, and a third information part representing mask sequence conversion and combining an orthogonal sequence selected from the basis orthogonal sequence based on the second

information part, a biorthogonal sequence obtained by combining the selected orthogonal sequence with the same symbols selected based on the first information part, and a mask sequence selected based on the biorthogonal sequence and the third information part.

25. (Original) The TFCI encoding method of claim 24, wherein the same symbols are 1s.

26. (Original) The TFCI encoding method of claim 24, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.

27. (Original) The TFCI encoding apparatus of claim 24, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

28. (Original) The TFCI encoding method of claim 24, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "000000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

29. (Original) The TFCI encoding method of claim 24, wherein the same symbols are multiplied by the first information part, the basis orthogonal sequences are multiplied by the respective TFCI bits representing the second information part, the basis mask sequences are multiplied by the respective TFCI bits representing the third information part, and the multiplication results are summed.

Claims 30 to 47 (Cancelled)

48. (Original) A TFCI decoding apparatus in a CDMA mobile communication system, comprising;

- a mask sequence generator for sequentially generating a plurality of mask sequences;
- an operation circuit for receiving an input signal and the mask sequences from the mask sequence generator, and removing a mask sequence from the input signal by multiplying the mask sequences by the input signal;
- a correlator for receiving signals from the operation circuit sequentially, calculating correlation value of each received signal with a plurality of orthogonal sequences having corresponding indexes, and sequentially selecting the largest correlation values and an orthogonal sequence index corresponding to the largest correlation value; and
- a correlation comparator for determining the highest correlation value out of the sequentially selected largest correlation values, from the correlator and outputting an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

49. (Original) The TFCI encoding apparatus of claim 48, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

50. (Original) The TFCI decoding apparatus of claim 48, further comprising a memory for storing the input signal and outputting the input signal to the operation circuit until the input signal is completely multiplied by the mask sequences generated from the mask sequence generator.

51. (Original) The TFCI decoding apparatus of claim 50, wherein the operation circuit is a multiplier.

52. (Original) The TFCI decoding apparatus of claim 48, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal.

53. (Original) A TFCI decoding apparatus in a CDMA mobile communication system, comprising;

- a mask sequence generator for sequentially generating a plurality of mask sequences;
- a plurality of operation circuits for receiving an input signal and the mask sequences from the mask sequence generator and multiplying the mask sequences by the input signal;
- a first correlator for calculating correlation values of the received signal with a plurality of orthogonal sequences, selecting the largest correlation value and an orthogonal sequence index corresponding to the largest correlation value;
- a plurality of secondary correlators for receiving the input signal and the outputs of the operation circuits, calculating correlation values of the received signals with a plurality of orthogonal sequences having corresponding indexes, and selecting the largest correlation value and orthogonal sequences index corresponding to the largest correlation value, respectably; and
- a correlation comparator for determining the highest correlation value from the selected largest correlation values received from the correlators and outputting TFCI information based on an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

54. (Original) The TFCI encoding apparatus of claim 53, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

55. (Original) The TFCI decoding apparatus of claim 54, wherein the operation circuits are multipliers.

56. (Original) The TFCI decoding apparatus of claim 53, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal corresponding to the determined correlation value.

Claims 57 to 66 (Cancelled)

67. (Original) A mask sequence generating method for use in a TFCI encoding and decoding, comprising the steps of:

selecting a Gold sequence which is determined by adding a first m-sequence and a second m-sequence, each of the m-sequences generated by different generation polynomials;

generating a first m-sequence group by cyclically shifting the first m-sequence where the first m-sequence is shifted one to 'n' times, 'n' is a length of the first and second m-sequences and each shift of the first m-sequence produces a sequence forming the first m-sequence group;

generating a second m-sequence group by cyclically shifting the second m-sequence where the second m-sequence is shifted one to 'n' times and each shift of the second m-sequence produces a sequence forming the second m-sequence group;

determining a column transposition function that converts sequences in the first m-sequence group to orthogonal sequences;

inserting a column of '0' in the front of the sequences in the second m-sequence group;

column changing the second m-sequence group by applying the reverse function of the sequence transposition function to generate mask sequences of the TFCI coding/decoding.